Chapter II

Area, Data and Methodology
In this study, an attempt has been made to analyse the socio-economic and demographic determinants of the acceptors of modern contraceptives in the demographically advanced states in India. The use of modern contraceptives is not uniform in all states of India, and that different states in India in the same stage of demographic transition exhibit vast socio-economic and demographic diversity. The states like Goa, Himachal Pradesh, Karnataka, Kerala and Tamil Nadu have shown relatively higher levels of family planning acceptance. The identification of factors that enhanced contraceptive acceptance in these successful states could be helpful in promoting family planning services in other states of the country. The identification of the determinants of contraceptive use, therefore, would be much more effective if the analysis is restricted to those successful states, which can be termed as, ‘demographically advanced’ states: The results were further verified with the help of a survey conducted in Kollam district of Kerala state in India. The detailed analysis of the present scenario and its past trends will help to shape and sharpen the strategies and processes that may be necessary to actualise the demographic transition in the near future in all the states in the country.

1. The Area

An analysis of the socio-economic and demographic characteristics of the contraceptive acceptors of all the 25 states is the main objective of this study. States like Goa, Himachal Pradesh, Karnataka, Kerala and Tamil Nadu have reached below ‘replacement level’of fertility, with a ‘total fertility rate’ (TFR) below 2.2. These states have shown relatively higher levels of contraceptive acceptance, consistently over a period. As a result these states have been able to bring down their total fertility rate considerably than other states of India. So the identification of the determinants of use of modern contraceptives were restricted to five successful states in India in terms of contraceptive use, ‘the demographically advanced states’, namely Goa, Himachal Pradesh, Karnataka, Kerala and Tamil Nadu in India.

The geographical area covered for the present study is all the states in India and the analysis has been done for 25 out of 26 states in India. The survey results for Tripura state was not published in National Family Health Survey (NFHS) 1998-99.
Final Report\(^1\). Similarly, the survey was not conducted in Sikkim in the first round during 1992-93. For the detailed analysis of the characteristics of contraceptive acceptors, states with ‘below replacement level of fertility’ were selected. Replacement level of fertility is generally taken as a total fertility rate (TFR) equal to 2.1 children. In this study, the states having a total fertility rate less than 2.2 are considered as demographically advanced states.

According to Sample Registration System (SRS, 1998; 46)\(^2\) among the major states in India, Kerala (TFR 1.8) and Tamil Nadu (TFR 2.0) entered into the stage of ‘replacement level of fertility’. According to National Family Health Survey (NFHS-2, 2000; 89)\(^3\), the states Goa, Himachal Pradesh, Karnataka, Kerala and Tamil Nadu had a total fertility rate less than 2.2. These five states were selected for a detailed analysis based on the NFHS 1993-92 survey database files. The population growth rates in Goa, Karnataka and Kerala declined rapidly during 1971-81. The lowest growth has been registered by Kerala (13.98), followed by Tamil Nadu (17.50) during this time period. The states like Goa and Himachal Pradesh showed a decadal growth rate of less than 20 percent during 1981-91, and Goa shown the highest rate of decline in growth rate (Bose, 1996; 89)\(^4\).

For a detailed study on the mechanisms through which the socio-economic and demographic determinants affect the contraceptive behaviour, the data was collected through a primary survey in Kollam district of Kerala. The district has been selected based on current and ever use of contraceptives, which is equivalent to the state average (RCH-RHS, 1998; 62)\(^5\), which is given in Appendix-2. Besides that, the district is a representative of Kerala in terms of literacy, religious composition, density, and have geographical features such as coastal areas, the plain land and hilly regions.

2. Data

For this study the data is generated from a primary survey, and also utilised the data collected from two rounds of National Family Health Surveys (NFHS) conducted during 1992-'93 and 1998-'99. Modern methods of family planning methods are reliable and effective in fertility regulation than traditional methods. Hence the detailed study is limited to the acceptors of modern contraceptives. There are two kinds of modern contraceptive methods – permanent and temporary. Permanent methods refer to the terminal methods of family regulation - male sterilisation (vasectomy) and female sterilisation (tubectomy). Temporary or reversible methods consist of condoms, pills, injections, Copper-T, intra uterine devices (IUDs).

A detailed analysis of the socio-economic and demographic determinants of the acceptors of modern contraceptives has been done in Kerala with the help of data collected from the field through a primary survey. The role of acceptors, especially the men as users and partners in family planning is an emerging issue in demography and not much detailed studies in this direction have been done in India. The analysis of Demographic Health Survey data (DHS) for several countries in the world shows that, about nine percent of all women who reported unmet need for contraception stated their husband’s disapproval as the reason for the same (Bongaarts and Bruce, 1994)\(^6\). Even though family planning decisions at household level is mainly a group affair of the couples, men are often avoided from detailed studies. Men has a decision making power in contraceptive choice as well as its continuous use. So in this study, the respondents are men in the age group 20-39. In Kerala, the age at marriage is higher, and since the respondents are currently married men, the interview restricted to the age group 20-39 years. Since the researcher, who conducted the survey being a male, detailed queries were carried out only among men.

2.1 Secondary Data

The major secondary data used in this study is National Family Health Survey (NFHS) data and Reports. NFHS first and second rounds collected information from 89,777 and 89,199 ever married women in 13-49 ages during 1992-'93 and 1998-'99

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respectively, and covering more than 99 per cent of India’s geographic area. Another source of data used is Reproductive and Child Health Project Rapid Household Survey (RHS) 1998-'99. It collected information from 474,463 women in the age group 15-44 who are usual residents of the surveyed households. The major topics covered in these surveys include fertility, marriage pattern, family size preferences, the level of unwanted fertility, knowledge and practice of family planning, the potential demand for contraception, utilisation of antenatal services, child health and nutrition, vaccination, and infant and child mortality. The tables pertaining to this study is used to illustrate and analyse the temporal changes in the use of contraceptive and its determinants in 25 states in India.

2.2 Primary Data

The primary data used for the study was collected by a fieldwork in Kollam district of Kerala during 15th May to 10th July 2001. During primary survey, the responses from more than 425 currently married men in 20-39 age groups were collected. The data were collected from two urban wards and six rural villages in the district. This is in accordance with the rural-urban distribution of population in the district – 25.9 percent urban and 74.1 percent rural (Census, 1991)\(^7\). This might be helpful in determining the rural-urban bias in the determinants of contraceptive usage, if any, in the study area. As the coastal area of the state is dense and more urbanised than other geographical regions in Kerala from time immemorial, the two urban wards, that were selected for fieldwork falls in coastal belt. The religious composition of the sample population was 68.7, 23.3 and 8.0 percent Hindus, Christians and Muslims respectively. Similarly, the scheduled caste, other backward castes and general population were in 0.8, 32.9 and 66.3 percent respectively (Census, 1991)\(^8\).

Number of sample households taken from each stratum was about 50. The rural wards having 1.0 percent population of the district (1991 Census) were listed and six villages selected for the survey. Similarly, urban blocks having 2.0 percent population were listed and two blocks were selected for interview. Two coastal wards, three villages each from plain and hilly region were selected for the survey. The data

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\(^8\) Calculated from the Census 1991 datafiles C-Tables.
has been subjected to scrutiny, mainly based on age and current marital status, and finally a total of 386 responses were taken for analysis. A well-structured questionnaire was used for the fieldwork. The questionnaire was pilot-tested with 20 men in New Delhi, and was revised based on their comments. The questionnaire used for the fieldwork is given in Appendix.

3. Definition of Terms

The important terms used in this study and their explanations were given in this section.

*Contraceptive method:* it is defined as the birth control method (IUSSP, 1958; 39). There are two types of contraceptive methods– permanent (for limiting) and temporary (for spacing). For spacing the births, both modern and traditional methods were using. Modern temporary (reversible) methods include condoms, pills/injections, intra-uterine devices (IUD), whereas the permanent methods include female and male sterilisation. The traditional methods such as rhythm, withdrawal and abstinence could be considered as temporary (PIP, 1997; 3).

*Knowledge of contraception:* it is defined as complete knowledge of the official modern methods of family planning – male and female sterilisation, the IUD, oral pills, condom and Copper-T, and the traditional methods – withdrawal, abstinence and rhythm methods.

*Contraceptive prevalence:* it is the proportion of married women in reproductive age group using contraception (Stover, 1997).

*Acceptors of Contraceptives:* The respondent/spouse is currently using a method of contraception. According to the time of usage of family planning methods, the acceptance also is divided into three categories – non-users, ever users and current users.

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Current users: it refers to the method that was being used by an individual client at the time of the survey. Thus, any respondent or spouse using a family planning method at the time of survey was regarded as a current user.

Ever users: it refers to the use of a contraceptive method at any time before the date of interview without making any distinction between past use and current use. Any respondent reporting that she or her spouse had ever used some form of contraception was counted as an ever user regardless of the time of use. Also, an ever user might have used more than one method.

4. Dependent Variable

The measurement of the use and non-use of contraceptives includes many stages. All the couples might either be users and non-users of birth control measures. Further, for the majority of the users, sterilisation was the first and the last method of contraception, as according to the NFHS-1, 82.0 per cent of women had not used any other method of contraception before accepting sterilisation (Visaria, 1999)\textsuperscript{12}. So in this study no separate attempt has been made to distinguish modern temporary and permanent methods, as well as male and female sterilisation. So in this study the major dependent variables used are:

(a) Ever use of any method,

(b) Ever use of any modern method,

(c) Current use of any method

(d) Current use of any traditional method,

(e) Current use of any modern method,

(f) Current use of any permanent method, and

(g) Current use of any temporary method.

Every couple has the freedom to use or not to use family planning methods. The first set of dependent variable used in this study is the percentage of couples in reproductive age groups using any family planning method. According to the nature

and type of method they are using, the users have been divided into users of modern methods and traditional methods. In this study modern methods include condoms, pills/injections, intra-uterine devices (IUD), female, and male sterilisation. The traditional methods include rhythm, withdrawal and abstinence. In some parts of the analysis detailed classifications of modern method again subdivided into permanent and temporary methods. In general, for analysis on the determinants of modern family planning methods, the dependent variable is the users of any modern method.

5. **Explanatory Variables**

A number of demographic and socio-economic characteristics of the couples are affecting their decision to adopt or not to adopt contraceptive methods. These variables act alone or as a combination of two or more variables. The major explanatory or independent variables used in this study are:

1. Place of residence
2. Religion
3. Age
4. Number of children surviving and their sex composition
5. Caste
6. Child loss
7. Still birth
8. Abortion
9. Levels of education
10. Occupation
11. Age at marriage
12. Mass media exposure
13. Standard of living /Type of household
14. Type of family
15. Parental family size
16. Source of contraception
A detailed description of the independent variables is given below.

5.1 **Place of Residence**

The urban environment provides new ideas, a technological setting altering the costs and benefits of children, and usually provides greater access to modern health care and family planning services, and hence the chances of accepting contraception among urban respondents is higher compared to that in rural areas. In this study, the rural area is considered as reference category for analysis. Studies shows that a better access to family planning methods will induce its practice, even among women who ever intended to use a method (O’ Connor, 1999)\(^{13}\).

5.2 **Religion**

Religion has a more significant influence on demographic behaviour in developing countries than in more developed countries. A high level of fertility has been associated with the religious prohibition of the use of birth control and values about the importance of children, priority of the family and gender. The reduction of fertility differences among religious groups suggests a decline in the influence of religion on the choices of persons about childbearing and contraceptive use (Moulasha and Rao, 1997)\(^{14}\). The religious affiliation is a societal determinant that influences a couple’s choice and acceptance of contraceptives. The major religions covered in this study for detailed analysis were Hindus and Muslims. As Hindus and Muslims constitute majority of the population in India, the comparison is made between them on their contraceptive practices. Hindus were treated as reference category while carrying out logit regression.

5.3 **Age**

Any individual has a probability to reproduce. It is zero at birth and reaches a peak in young adults. Age also can be considered as an indicator of generation gap. Couples in younger age group have a higher possibility to have a liberal attitude towards family limitation and planning. The young age structure of the growing population

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demands a greater emphasis on the promotion of contraceptive methods, particularly in the early stages of their marital life (Baburajan and Verma, 1993; 5). Similarly, age of the couples were inversely proportional to the desire for additional children (M. Islam et al, 1998), and hence the couples with higher ages can have a desire to stop fertility process, and this might result in higher acceptance of terminal methods, if the family planning services were available to them.

5.4 Number and Sex Composition of the Children

Sex composition of the living children is more often noticed to be influencing the decisions of the couples regarding family size, fertility regulation and acceptance of family planning, specifically sterilisation (Rao and Somayajulu, 1999). In India, son preference is strong and is often cited as one of the major obstacles in the reduction of national fertility level (Khan and Prasad, 1985; Nag, 1992; Malhi, 1993; Rajaretnam and Deshpande, 1994). The difference in gender preference is linked with cultural difference in southern and northern parts of the country in terms of marriage practices, kinship structure, property inheritance rights and status of women (Dyson and Moore, 1983). If there is no profound gender preference among couples in India, there is significant increase in contraceptive acceptance, the female sterilisation in particular, and that a moderate change in gender preference also will make a significant change in contraceptive prevalence and subsequently on fertility (Kulkarni, 1999). Couples who have only daughters seems to be less receptive to the idea of family planning and

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contraceptive use than their counterparts who have at least one son in addition to daughters (Ullah and Chakraborty, 1993; 25). Here, having no living sons is considered as reference category during logit analysis.

5.5 Caste

Scheduled castes and tribes are groups that the Indian Government identified as socially and economically backward and in need of special protection from social injustice and exploitation. Caste also is an important determinant of contraceptive acceptance. Many studies conducted in India showed that the backward caste and scheduled caste population lag in the performance of family planning. For each of scheduled castes and scheduled tribes, all other sections of the population is treated as the reference category.

5.6 Infant/Child loss

Researchers have argued that a high probability of child survival is necessary for couples to use family planning (Taylor, Newman and Kelly, 1976)22. Experience of infant and child loss more often encourage the parents to go for higher family size and discourages them to go for terminal methods of family planning, in order to assure at least a few number of living children at the end of their reproductive span. Experience of child death is regarded as the reference category.

5.7 Experience of Stillbirth

The experience of stillbirth and abortion influences the use of contraceptives. In this study both neonatal and natal deaths were not distinguished, as in some cases, even if the child death occurred immediately after delivery, the medical personnel will not tell the same to the patients. Couples, who had the stillbirths or abortions usually had to wait for some period (not less than one year) before next pregnancy, and during this period, the couples might use some kind of spacing methods.

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5.8 **Experience of Abortion**

Couples, who had the experience of spontaneous or induced abortions usually had gestation period (waiting time for the onset of menstruation and for the incidence of fecundity), during this period the couples might use some kind of spacing methods. In light of greater awareness of family welfare services and declining family size norms as a reason probably takes the lead in seeking abortion (Das et al, 2000)\(^\text{23}\). Similarly, there is no attempt to separate spontaneous and induced abortions has been made, since many women reported having spontaneous abortion probably had had an induced one, and were reluctant to report it as such. Experience of abortion or stillbirth is regarded as the reference category.

5.9 **Education**

Even low levels of schooling apparently suffice to contribute towards a small family norm, though the extent of it is debatable and whether the effect arises from changes in attitudes or because education furnishes people with new knowledge. This variable is used as a categorical variable in this study. The five main categories include illiterate, primary class completed, upto high school, graduation and above for both men and women. The major analysis has been done by considering illiterates as the reference category.

5.10 **Occupation**

Occupation is directly related to economic well being of a family. Women's occupation is considered to be one of the powerful indicators assuring the their role and power in household decision-making. The major categories of occupation here is unemployed, self-employed (includes daily wages) and salaried. Even though working status of husbands also included in first stages of the analysis, later it is found that as more than 85 percent of the husbands are working, this variable is not included in the final regression exercises, and hence dropped from the final analysis. Here women who are not working for wage is considered as the reference category.

5.11 Age at Marriage

Studies have shown that fertility transition in advanced countries with low fertility has mainly occurred because of the change in nuptiality pattern; a reduction of the proportion of married people at ages 15-19 and 20-24, and consequently an increase in age at marriage (Yushiro, 1998; 130) and (Ueno 1998)24. As age at marriage increases, the reproductive span decreases and the number of pregnancies may decrease, even without use of contraception. The indirect effect is that, at higher age at marriage implies a more rational physical and socio-economic development, which ensures healthy child, and reduces the chances of infant mortality. Age at marriage also amplifies the perceptions and awareness about family planning methods. It is also found that, as age at marriage of the couples increases, they wish to have their desired number of children very soon after the marriage, and then go for sterilisation operations. This implies in lesser acceptance of temporary contraceptives among couples with high age at marriage.

5.12 Mass Media

The onset of the electronic era has also persuaded the researchers to emphasise the importance of the media. Exposure to mass media is an effective means to promote awareness on a wide variety of health services, especially family planning. A family planning advertisement sensitise the audience to the issue of fertility regulation or provides information on a wide range of contraceptive methods, and promoting the concept of 'responsible parenthood' (Foreit et al, 1998)26. It can be assumed that couples who are aware of all family planning methods are much more likely to contracept than those with lower levels of awareness. Non-exposure to mass media messages is considered as reference category.

5.13 **Standard of Living / Type of household**

Standard of living index is a composite index, calculated based on National Family Health Survey data, and is provided by International Institute for Population Sciences, Mumbai. It is a measure of the availability of household amenities. Weights were assigned to the amenity's economic value and importance. The index is made upon commodities such as a flush toilet, lighting, a separate kitchen, number of rooms, type of fuel used for cooking, structure of the house, source of drinking water, presence of livestock, ownership of consumer durables, etc. A high standard of living score reflects consumer behaviour more than overall economic levels in the state (Zavier and Padmadas, 2000)²⁷. In the absence of reliable data on income or standard of living index, the type of roofing material used in the house serves as a good proxy for the economic status of the households (RHS, 2000; p.13). In this study, the houses were classified into three types based on the materials used on the walls and roof of the houses: *kuchcha*, *semi-pucca* and *pucca* which is an indicator to know whether they belonging to low, medium or high status families. In the analysis of secondary data, lower standard of living is treated as the reference category, whereas, in the analysis of primary data, those living in *kuchcha* households were treated as reference category.

5.14 **Type of family**

In many developing countries parents still have a tremendous influence over their children and have influence in decisions regarding family formation (Briggs, 1998)²⁸. In developing countries, the extended family values high fertility. In the modern era, couples prefer to live in nuclear families rather than joint families. The nuclear family system can be found in the transitional stages of demographic cycle because of the death among older generation, the departure from the joint family of surplus married brothers and sisters (Niranjan et al, 1998)²⁹. The type of family, especially the nuclear family system encourages the couples in following their own preference in their


family and fertility related issues. In the analysis of primary data, people living in nuclear families were considered as reference category.

5.15 Parental Family size

Large family size of the couple's parental family may negatively influence the likelihood of limiting their own family size. Large family size combined with low levels of parent's education is found to have a bearing on the acceptance of a family planning method (Kailash, 1995). 30

5.16 Source of Contraception

In India, public sector is the largest provider of family welfare services, since the majority of the acceptors opted the terminal method of female sterilisation. The sterilisation operations are free and often come with certain incentives, and prompt the acceptors to utilise public sector for performing this operations. The role of private sector is noteworthy in providing curative and temporary contraceptive services.

6. Methodology

In order to identify the factors that promote the use of a modern method of family planning, the data generated by the National Family Health Survey I and II Rounds were used. States like Goa, Himachal Pradesh, Karnataka, Kerala and Tamil Nadu have reached below 'replacement level' of fertility, with a 'total fertility rate' (TFR) below 2.2. These states have shown relatively higher levels of contraceptive acceptance, consistently over a period. So the detailed analysis of the determinants of use of modern contraceptives was restricted to these five states in India. The analysis results were tried to validate with the help of the data collected from a survey conducted in Kollam district of Kerala state in India.

The users of any method versus non-users (ever users as well as current users) were included in the first set of analysis. The users of any modern method versus traditional methods are the unit for further analysis in this study. As it is found that majority of the acceptors of modern methods are the practitioners of sterilisation, no separate attempt has been made for users of spacing methods such as Pill, IUD,

Injections and Condoms. Currently married and non-pregnant women in 13-49 ages living with their husbands were selected from the NFHS-1 and NFHS-2 datasets for detailed analysis.

6.1 Tabulation

The raw datafiles generated from I and II Rounds of National Family Health Surveys were used for tabulation and analysis in this study, apart from the primary survey data. In case of Primary data, the survey schedules were cross checked, and the data were entered into the database prepared in SPSS. After cleaning and ensuring the completeness of the responses, the data used for further statistical treatment.

In this study, both cross-tables and logistic regression equations are used. The cross-tables are made out for testing the hypothesis from each set of these survey data. Only non-pregnant and currently married couples in their reproductive ages are taken into consideration for higher-level analysis.

The main objective of the study is to identify the socio-economic determinants of the acceptance of modern contraceptives in five demographically advanced states in India, using data generated by NFHS-1 and NFHS-2, and verification of the results with the data collected through a primary survey conducted at Kollam district of Kerala. The dependent variable here is whether a person is uses modern contraceptives or not, and hence become a dichotomous variable. The variable is given value ‘1’ when the answer is ‘Yes’ and ‘0’ when the answer is ‘No’. The socio-economic determinants of this dependent variable are given in the previous section. Fitting an ordinary least square regression model in this case is mathematically possible, but not conceptually. When we work out the estimated values of the dependent variable, if the values are between ‘0’ and ‘1’, they can be taken as the probability instead of actually frequency. However, estimated values can also go below ‘0’ and above ‘1’, which cannot be interpreted in terms of probability.

In order to avoid this problem, logistic regression suggested whenever the dependent variables are dichotomous. In logistic regression, the lower limit and upper limit of the dependent variables are fixed and they cannot go beyond ‘0’ and ‘1’.
6.2 Logistic Regression

In this study, the dependent variables are dichotomous ('Yes' or 'No' answer type or '1' and '0' type), ordinary least square regression equations could not be employed to find out magnitude and nature of effects of independent variables.

If 'p' is the probability of a phenomenon, it is converted into 'odds ratio' as,

\[ \frac{p}{q} = \frac{p}{1 - p} \]

Log of odds, ie, \( \log \frac{p}{1 - p} \) is known as logit of p.

Logit of p can written alternatively as the equation,

\[
\text{Logit } p = b_0 + b_1 X_1 + b_2 X_2 + \ldots + b_k X_k \quad (1)
\]

Or

\[
\log \frac{p}{1 - p} = b_0 + b_1 X_1 + b_2 X_2 + \ldots + b_k X_k \quad (2)
\]

That is,

\[
\log \Omega = b_0 + b_1 X_1 + b_2 X_2 + \ldots + b_k X_k \quad (3)
\]

The equation can be written as,

\[
\log \Omega = a + bE + cU + dl \quad (4)
\]

Taking the exponential of both sides, we get,

\[
\Omega = e^{a + bE + cU + dl} \quad (5)
\]

These equations are in the familiar form of an ordinary multiple regression equation. This is advantageous, because some of the statistical tools previously developed for multiple regression can now be applied to logit regression.

Suppose, if we increase E by one unit, the \( \Omega \) become \( \Omega^* \), and can be written as,

\[
\Omega^* = e^{a + b(E+1) + cU + dl} \quad (6)
\]

\[
= e^{a + bE + cU + dl + b} \quad (7)
\]

\[
= e^{a + bE + cU + dl} e^b \quad (8)
\]

\[
\Omega^* = \Omega e^b \quad (9)
\]

Which can be written alternatively as
\[ \frac{\Omega^*}{\Omega} = e^b \quad \text{(10)} \]

It is clear from the equations (9) and (10) that a one-unit increase in \( E \), holding other variables constant, multiplies the odds by the factor \( e^b \). The quantity \( e^b \) is called an odds ratio. The log odds, \( e^b \) is more readily understandable than \( b \) as a measure of effect. When we consider the log odds as the response variable, the logit model is an additive model, as in ordinary multiple regression.

In this study, the logistic regression was done using maximum likelihood method. The maximum likelihood method is a way of finding the smallest possible deviance between the observed (independent) and predictor (explanatory) values using the calculus (derivatives). The SPSS programme uses different iterations in which it tries different solutions until it gets the smallest possible deviance or the best fit. It is referred to as \(-2 \text{ Log Likelihood}\). It can be considered as Chi-square value.

In the logistic model, an odds ratio of 1.0 indicates there is no relation between the dependent variable and the explanatory variable. A statistically significant log odds ratio below 1.0 means that the independent variable has a negative impact, while an odds ratio above 1.0 means that the independent variable has a positive effect.